[Attachment 1]

4(d) Rule Evaluation and Recommended Determination

FMEP Submitted by: Oregon Department of Fish and Wildlife

Fisheries or Area: Siltcoos and Tahkenitch Lakes coho salmon fishery

ESU: Oregon Coast coho salmon (*Oncorhynchus kisutch*)

4(d) Rule Limit: Limit 4

Date:

Tracking Number: NWR/4d/04/2003/002

The Oregon Department of Fish and Wildlife (ODFW) has submitted a Fisheries Management and Evaluation Plan (FMEP) for a proposed fishery on coho salmon in Siltcoos and Tahkenitch Lakes (ODFW 2003), located south of the town of Florence, along the Oregon Coast. This plan was submitted to the National Marine Fisheries Service (NOAA Fisheries) for approval under limit 4 of the final 4(d) Rule (50 CFR 223.203(b)(4); July 10, 2000, 65 FR 42422) on May 15, 2003. Following public review and subsequent revisions to the FMEP to address comments, a final version of the FMEP was submitted to NOAA Fisheries in November 2003. That final FMEP is being evaluated in this document.

Evaluation

The 4(d) Rule for the Oregon Coast coho salmon Evolutionarily Significant Unit (ESU) states that the prohibitions of paragraph (a) of the rule do not apply to fishery harvest activities provided that:

- Fisheries are managed in accordance with a NOAA Fisheries approved FMEP, and
- Fisheries are implemented in accordance with a letter of concurrence from NOAA Fisheries.

NOAA Fisheries will approve an FMEP if it adequately addresses the criteria specified below. The following is an evaluation of whether the submitted FMEP adequately addresses the criteria for limit 4 of the final 4(d) Rule for Oregon Coast coho salmon.

Limit 4 Criteria and FMEP Evaluation

(4)(i) Clearly defines its intended scope and area of impact

The area is Siltcoos and Tahkenitch Lakes, located south of Florence along the Oregon Coast (Figure 1), the only location in which the proposed fisheries would occur. The only ESU affected is Oregon Coast coho salmon. Contingent upon first satisfying criteria for achieving viable coho salmon populations in Siltcoos and Tahkenitch Lakes, fisheries in the lakes could occur from October 1st through December 31st (see section 4(i)(B) and 4(i)(C), below). The inlet and outlet streams to the lakes would all be closed to fishing when coho salmon are present.

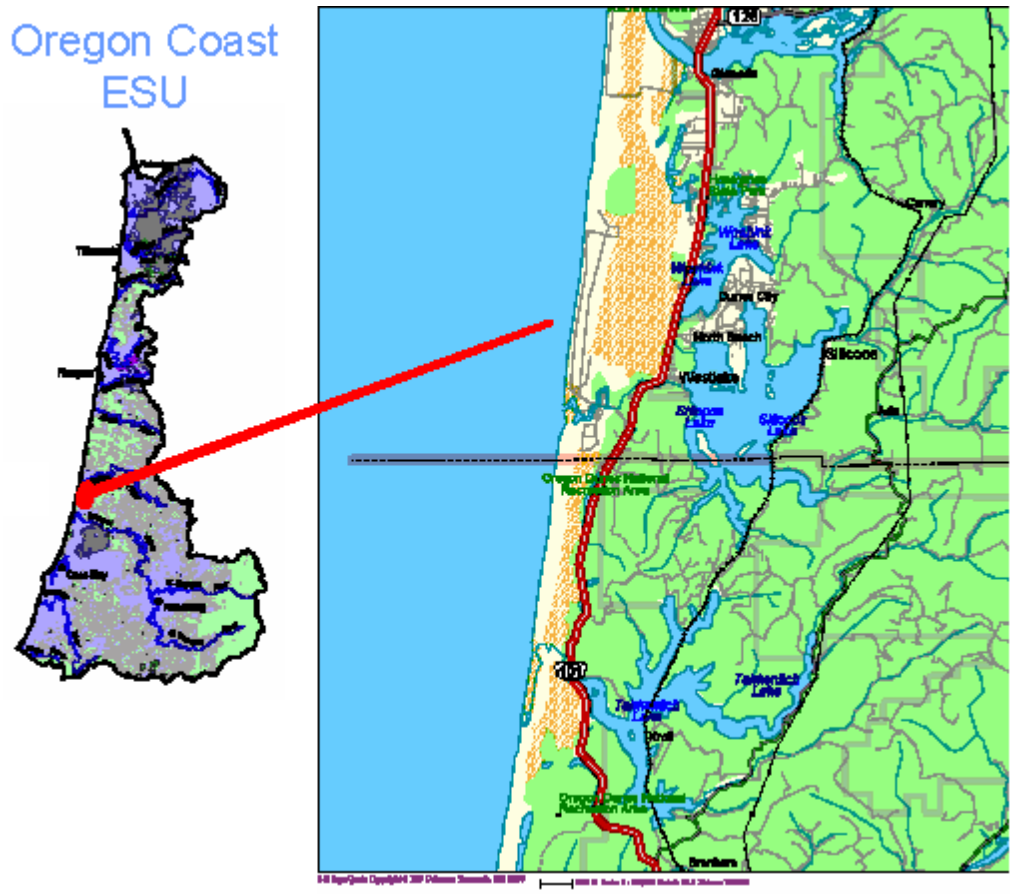

Figure 1. Map of Tahkenitch and Siltcoos Lakes along the Oregon Coast.

(4)(i) Sets forth the management objectives and the performance indicators for the plan

There are three objectives involved in managing Siltcoos and Tahkenitch Lakes coho salmon:

- Manage for viable coho populations in Siltcoos and Tahkenitch Lakes.

- Provide an opportunity for recreational anglers to harvest between 300 to 600 adult coho from Siltcoos Lake and 200 to 400 adult coho from Tahkenitch Lake in years when returns exceed the specified spawner abundances in Indicator 3 below. For the 2003 fishing season the maximum harvest will be 300 adult coho salmon from Siltcoos Lake and 200 adult coho salmon from Tahkenitch Lake.

- Provide a fishery on coho in Siltcoos and Tahkenitch Lakes that is consistent with impact levels to the Oregon Coastal Coho ESU as outlined in the Pacific Fishery Management Council's (PFMC) Amendment 13 to the Salmon Fishery Management Plan (PFMC 2003).

The performance indicators that will be monitored and evaluated for each management objective include:

- Coho Protection
  - Annual spawning surveys indicate spawner abundance at least 3,300 adults for Siltcoos Lake and 2,200 for Tahkenitch Lake. These values represent the upper bounds of the 90% confidence interval for the Maximum Sustained Production (MSP) spawner abundance.
  - Annual spawning surveys show distribution of coho spawners throughout suitable habitat in each basin.

- Sport Fishery Contribution
  - Statistical creel data shows a combined harvest of adult coho salmon between 200 and 1,000.
  - Statistical creel data shows angler effort of 800 to 4,000 angler days per season (assumes four angler days per adult coho harvested.)

- Fishery Impact Levels
  - Statistical creel data and annual spawning surveys show exploitation rates that are consistent with the adopted harvest matrix for each coho population.

The management objectives and performance indicators for the FMEP were designed to monitor the impacts of the fishery to ensure sufficient escapement occurs after the fishery and the productivity of the population is maintained. In addition, the catch of coho in the fishery will also be monitored to verify whether angler participation is sufficient to warrant the fishery.

(A) Defines populations within affected ESUs, taking into account: spatial and temporal distribution, genetic and phenotypic diversity, and other appropriate identifiably unique biological and life history traits

The FMEP describes the affected population and pertinent life-history information. The ODFW and NOAA Fisheries Technical Recovery Team (TRT) has determined that coho salmon in these lakes are likely one independent population. These lakes are not seeded by any coho salmon propagation program. An important consideration for NOAA Fisheries is that other coho salmon populations will not be affected by this FMEP, since fish are unlikely to leave the lakes and outlet stream to re-enter marine waters and then return to freshwater and spawn elsewhere.

The general life history characteristics of the runs of coho salmon returning to Siltcoos and Tahkenitch Lakes are similar to other runs in the ESU. Returning adults are predominately three year olds. Juvenile coho salmon spend about one year growing in freshwater before emigrating to the ocean as one-year-old smolts. Characteristically, coho salmon seek refuge from rain-swollen high-flow main channel areas. Ponds, side channels, and lakes like these provide ideal habitat for coho salmon to rear and grow. Coho salmon from such areas typically migrate to the ocean at a larger size and enjoy higher survival rates than those rearing in other areas. The runs of coho salmon in these lakes are unique for the Oregon Coast ESU. There is only one other substantial run of coho salmon that returns to a lake – Tenmile Lake, located south of Siltcoos and Tahkenitch Lakes. The unique characteristics of these coastal lake environments is likely the reason why these coho salmon have been more productive. The importance of these runs to the ESU is assessed in section (D) below.

(B) Uses the concepts of ''viable'' and ''critical'' salmonid population thresholds, consistent with Viable Salmonid Populations (VSP) concepts in the technical document "Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units" (NMFS 2000)

The regulations in the 4(d) Rule state an FMEP must use the concepts of "viable" and "critical" thresholds in a manner so that fishery management actions: (a) recognize significant differences in risk associated with viable and critical population threshold states; and (b) respond accordingly to minimize long-term risks to population persistence. Harvest actions that impact populations at or above viable threshold must maintain the population or management unit at or above the viable level. Impacts on populations above critical levels but not at viable levels (demonstrated with high degree of confidence) must not appreciably slow achievement of viable function. Impacts on populations functioning at or below critical threshold must not appreciably increase genetic and demographic risks facing the population and must be designed to permit achievement of viable functions, unless the FMEP demonstrates that the likelihood of survival and recovery of the entire ESU in the wild would not be appreciably reduced by greater risks to an individual population. This is the language from limit 4 of the 4(d) Rule. It is not likely that a directed fishery on a listed

population that is functioning at or below critical levels would be proposed. In this case, a directed fishery on wild coho salmon is being proposed on a population that has been functioning at viable levels.

The above guidance in the 4(d) Rule regulations for limit 4 is important for the evaluation of this FMEP. The ODFW asserts that coho salmon returns to Siltcoos and Tahkenitch Lakes are large enough to support limited recreational fishing, and is proposing to harvest some wild coho salmon in a manner that (1) maintains an abundant and productive coho population into the future, and (2) ensures that the harvest in the lakes does not exceed the cumulative harvest limits specified in the Pacific Fishery Management Council's Amendment 13 to the Pacific Salmon Plan (the harvest framework plan for the Oregon Coast coho salmon ESU; Table 1).

Table 1. The current harvest management matrix for Oregon Coast coho salmon in PFMC Plan Amendment 13 (PFMC 2003).

Parent Spawner Status [1]	Marine Survival Index (based on return of jacks per hatchery smolt)			
	Extremely Low (<0.0003)	Low (0.0003 to 0.0014)	Medium (>0.0014 to 0.0040)	High (>0.0040)
High Parent Spawners ≥ 75% of full seeding	E ≤ 8%	J ≤ 15%	O ≤ 30%	T ≤ 45%
Medium Parent Spawners ≥ 50% & < 75% of full seeding	D ≤ 8%	I ≤ 15%	N ≤ 20%	S ≤ 38%
Low Parent Spawners ≥ 25% & < 50% of full seeding	C ≤ 8%	H ≤ 15%	M ≤ 15%	R ≤ 25%
Very Low Parent Spawners < 4 fish per mile & < 25% of full seeding	B ≤ 8%	G ≤ 11%	L ≤ 11%	Q ≤ 11%
Critical [2] Parental Spawners ≥ 4 fish per mile	A 0 - 8%	F 0 - 8%	K 0 - 8%	P 0 - 8%

Sub-aggregate and Basin Specific Spawner Criteria Data

Sub-aggregate	Miles of Available Spawning Habitat	100% of Full Seeding	"Critical"		Very Low, Low, Medium & High		
			4 Fish per Mile	12% of Full Seeding	16% of Full Seeding	50% of Full Seeding	75% of Full Seeding
Northern	399	21,700	2,538	NA	4,129	10,850	16,275
North - Central	1,159	55,000	4,852	NA	10,450	27,500	41,250
South - Central	1,825	50,000	8,740	NA	9,500	25,000	37,500
Southern	450	5,400	NA	843	1,026	2,700	4,050
Coastwide Total	4,191	132,100	15,838		25,099	66,050	99,075

[1] Parental spawner abundance status for the OCN aggregate assumes the status of the weakest sub-aggregate.

[2] "Critical" parental spawner status defined as 4 fish per mile for the Northern, North-Central, and South-Central sub-aggregates. Because the ratio of high quality spawning habitat to total spawning habitat in the Rogue River Basin differs significantly from the rest of the basins on the coast, the spawner density of 4 fish per mile does not represent "Critical" status for that basin. Instead, "Critical" status for the Rogue Basin (Southern Sub-aggregate) is calculated as 12% of full seeding of high quality habitat.

NMFS (2000) "Viable Salmonid Populations and the Recovery of ESUs" document describes four key parameters for evaluating the status of salmonid populations. These parameters are

population size (abundance), population growth rate (productivity), spatial structure, and diversity. The ODFW Siltcoos and Tahkenitch Lakes coho FMEP designates critical and viable thresholds for each lake basin (Table 2). For the full assessment of how the thresholds were established, see the FMEP and Zhou (2000). The FMEP anticipates that as more information and analyses become available, the thresholds may need to be revised. Section 3.5 of the FMEP specifically states that the thresholds will be refined, if necessary. Recovery planning efforts are currently underway by NOAA Fisheries TRT for the Oregon Coast ESU. Information evolving from the TRT has been incorporated into this evaluation. Once the TRT publishes their Viability Guidelines for the ESU, this information will likewise be incorporated into this FMEP. This adaptive management approach is consistent with the guidelines provided in the VSP technical document (see page 30 of NMFS 2000). Below is an evaluation of whether the FMEP adequately addresses the VSP parameters for Siltcoos and Tahkenitch Lakes and the Oregon Coast ESU.

Table 2. Critical and viable thresholds specified for each lake in the ODFW FMEP.

Return area (one population)	Critical Threshold	Viable Thresholds[†]	Associated hatchery stock(s)
Siltcoos Lake Basin	**Abundance**: 368 adults per year	**Abundance**: 1,800 adults per year **Productivity**: long term average replacement rate equal to or greater than one	None
Tahkenitch Lake Basin	**Abundance**: 105 adults per year	**Abundance**: 880 adults per year **Productivity**: long term average replacement rate equal to or greater than one	None

[†] Productivity, spatial structure, and diversity parameters will be considered in the annual review of any potential fishery

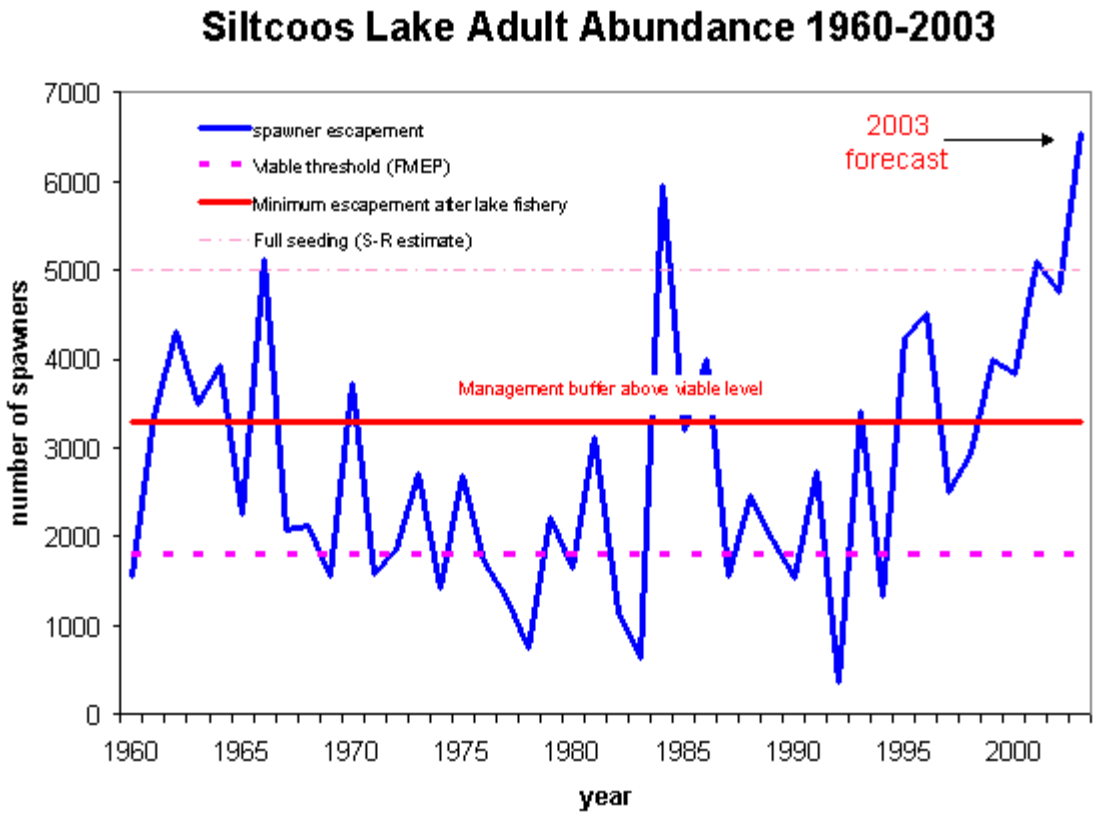

Figure 2. Spawning escapement of coho salmon in Siltcoos Lake Basin from 1960 to 2003. The viable and minimum escapement level (which includes a management buffer above the viable level) specified in the ODFW FMEP are shown. The full seeding level estimate (5,000 spawners) was taken from the stock-recruit assessment in Zhou (2000).

Population Size

Critical and viable abundance thresholds were specified for each lake basin in the ODFW FMEP (Table 2). However, only the viable abundance thresholds will be used to manage the coho salmon fishery in the lakes. The runs must be forecasted to exceed the viable thresholds plus a management buffer in order for a lake fishery to occur. The fishery will be abundance-based and inseason regulation will be timely. If returns drop below the viable levels, there will *not* be a coho fishery in the lakes.

For the Siltcoos Lake Basin, the viable abundance level of 1,800 adults per year specified in the FMEP is the lower bound of the 90% confidence interval for the maximum sustained production estimate from the stock-recruit analyses conducted by Zhou (2000). Since there is some uncertainty of the exact MSP level, ODFW specified the upper bound of the 90% confidence

interval of 3,300 adults as the minimum escapement level for managing the Siltcoos Lake fishery. In other words, ODFW will manage the fishery so that at least 3,300 adults will escape the fishery and spawn throughout the Siltcoos Basin annually (see Figure 2). There would be no fishery at escapements smaller than 3,300 adult coho salmon.

For the Tahkenitch Lake Basin, the viable abundance level of 880 adults per year specified in the FMEP is the lower bound of the 90% confidence interval for the maximum sustained production estimate from the stock-recruit analyses conducted by Zhou (2000). Since there is some uncertainty of the exact MSP level, ODFW specified the upper bound of the 90% confidence interval of 2,200 adults as the minimum escapement level for managing the Tahkenitch Lake fishery. In other words, ODFW will manage the fishery so that at least 2,200 adults will escape the fishery and spawn throughout the Tahkenitch Basin annually (see Figure 3). The same approach as in Siltcoos Lake would apply here, and fishing would be closed unless escapement levels exceeded 2,200 adult coho salmon.

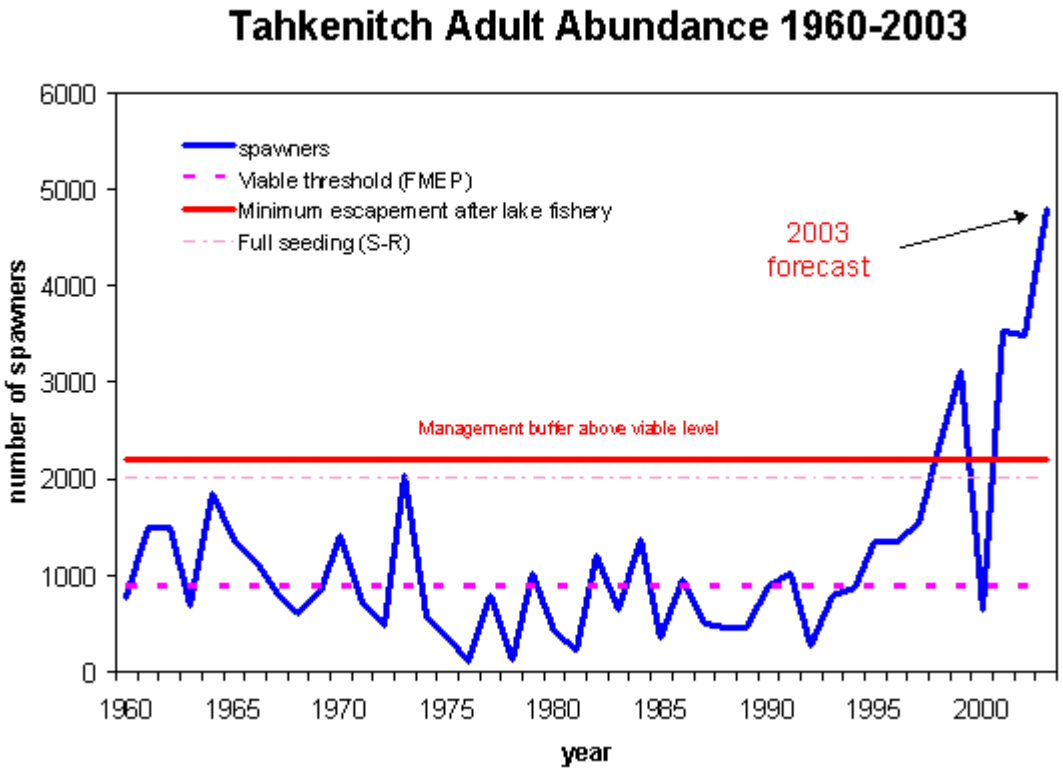

Figure 3. Spawning escapement of coho salmon in Tahkenitch Lake Basin. The viable level and minimum escapement level (which includes a management buffer above the viable level) specified in the FMEP are shown. The full seeding level estimate (2,000 spawners) was taken from the stock-recruit assessment in Zhou (2000).

Population Growth Rate

Data from both lakes indicate that coho salmon productivity naturally fluctuates and that relatively small escapements can produce much larger returns (see Figures 4 and 5). For Siltcoos Lake, a spawner abundance as few as 2,000 to 3,000 fish has produced as many as 10,000 to 20,000 recruits in the next generation. In Tahkenitch Lake, as few as 500 spawners has produced more than 3,000 recruits. Minimum escapement levels of 3,300 and 2,200 spawners in Siltcoos and Tahkenitch Lakes (before any fisheries can occur), respectively, appear to be protective.

The average replacement rate for brood years 1960 through 1999 has averaged approximately 1.53 for Siltcoos Lake and 1.54 for Tahkenitch Lake. NMFS (2000) states that a viable population will have replacement rates equal to or greater than one over the long term (i.e., multiple generations). The lake fishery would be managed to ensure that fishery impacts in the lakes do not cause replacement rates to decline below an average value of one. In the future, there may be years in which replacement rates are less than one, due to natural population dynamics. For example, the replacement rate for coho salmon returns in 2006 will likely be less than one, due to the very large number of spawners in 2003. Productivity rates will be included in the consideration of any proposed fishery; any substantial drop in the average productivity due to low abundance will be taken into account when NOAA Fisheries determines whether to allow a fishery. In any case, under the FMEP, a fishery will not be allowed to cause escapement to fall below the minimum escapement levels stated above.

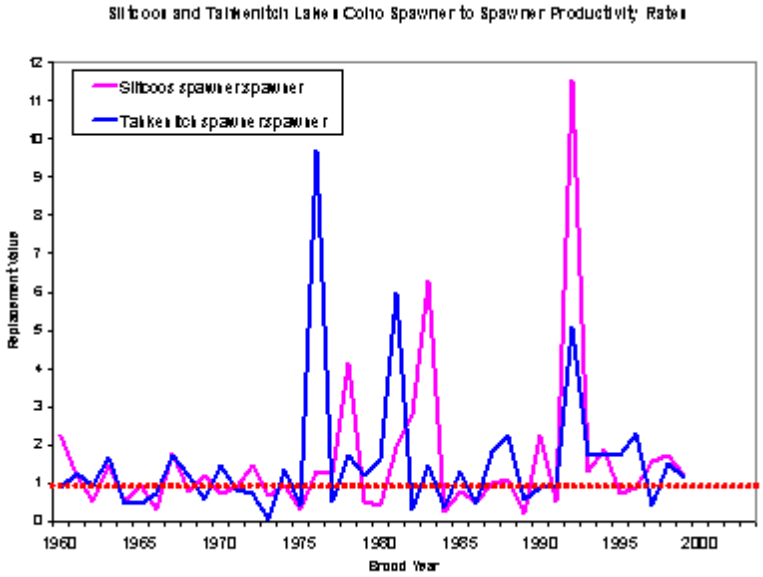

Figure 4. Spawner to spawner replacement rates based on reported spawner abundances in Siltcoos and Tahkenitch Lakes basins.

Spatial Structure

Spatial structure is important to minimize vulnerability of a population to catastrophic loss and to support natural metapopulation processes. Fisheries can affect the spatial structure of a population and/or ESU. For example, a fishery can disproportionally affect a certain portion of the run, which may result in a substantial decrease in the number of spawners destined for a particular spawning location. The early portion of a run of salmon may be the fish that migrate the furthest upstream. If the fishery only harvests the early returns, the spawning distribution of a population may change.

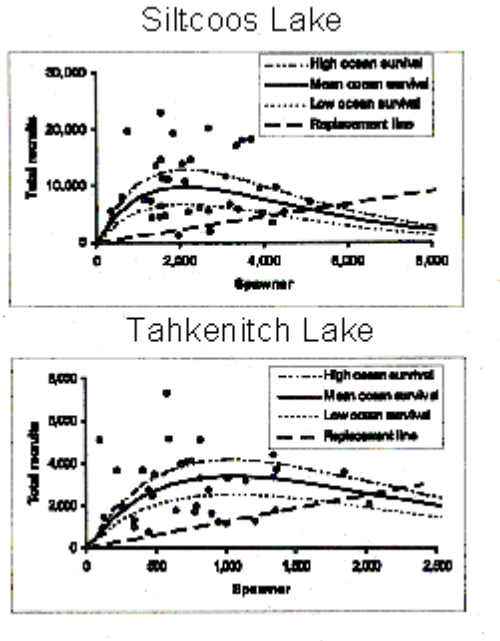

Figure 5. Stock-recruit relationship for coho salmon in Siltcoos and Tahkenitch Lakes. Taken from Zhou (2000). The number of recruits is per spawner.

Between 1960 and 1992, the average catch was 361 fish in Siltcoos Basin and 30 fish in Tahkenitch Basin. The catch was distributed throughout the entire run in approximately the following percentages: 20% in October, 60% in November, and 20% in December. The modest harvest limits specified in the FMEP and the closure of areas in the vicinity of spawning grounds to all fishing are strong protections against impacting coho salmon spatial structure in the lakes. Escapement monitoring required by the FMEP will be important for on-going evaluation of spatial structure.

Another important spatial structure consideration is whether the fishery is likely to affect coho salmon recovery in nearby streams and rivers (Figure 6). Siltcoos and Tahkenitch Lake coho salmon may be a source population that "seeds" other adjacent populations, especially in abundant return years (like 2003). This must be an important consideration in managing ocean fisheries that intercept fish on their return to spawning areas.

Figure 6. Map of the coho salmon spawning habitat (in green) in Tahkenitch and Siltcoos Lake Basins. Taken from the FMEP.

Lake fisheries are unlikely to affect coho salmon escapement or recovery elsewhere. Coho salmon can be ready to spawn shortly after entering these lakes. A coho salmon would have to emigrate back out to saltwater from freshwater, then migrate to an adjacent river, re-enter freshwater, migrate upstream, and spawn. This type of natural straying probably has occurred in the past, but is likely to be rare. Therefore, once the coho salmon are in the lakes, they are most likely going to spawn in the tributaries of Siltcoos and Tahkenitch Lakes. Harvest under the FMEP would be limited and not expected to preclude any natural straying and recolonization by wild coho salmon.

It is also important to consider what effect a fishery might have on the input of ocean-derived nutrients to the stream and terrestrial environment (Cederholm et al. 1999). The literature has shown returning salmon provide valuable ocean-derived nutrient input to their freshwater ecosystem after they die. Salmon carcasses can provide food for aquatic and terrestrial species. After a carcass decomposes, some of the nutrients can be dissolved and taken up by other stream organisms. Actions that reduce salmon survival (including harvest, habitat, and propagation activities) can result in too few salmon spawning and contributing essential carcass-derived nutrients.

Public comment on the FMEP provided scientific literature stating 200 spawners per mile provide sufficient nutrient input to small streams (Bakke 2003). An assessment of the number of adult coho spawners per mile of spawning habitat in 2002 and the forecasted 2003 escapement suggests spawner density has been near or above 200 spawners per mile (Figure 7).

A variety of physical and biological factors affect the input of carcass-derived nutrients input into the stream ecosystem. Since coho salmon return during the fall and winter periods, increases in stream discharge can wash carcasses out of the spawning areas and into the lakes. The benefits of carcasses providing nutrients to the streams would be reduced. The presence of woody debris, backwater pools, and side channels increases the retention of salmon carcasses and nutrient input into the stream (Cederholm et al. 1999). Important Siltcoos and Tahkenitch tributary streams will not fully benefit from salmon carcasses until channel complexity and woody debris amounts increase (L. Kruzic, NOAA Fisheries, personal observation).

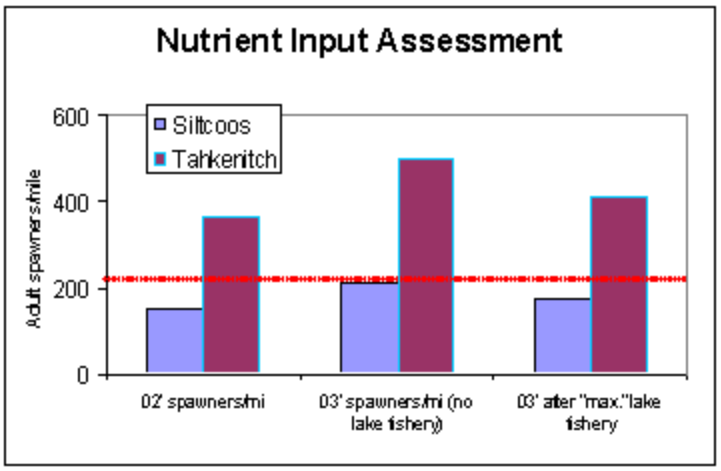

Figure 7. Assessment of potential carcass densities in the lake basins. Estimated spawning miles from Jacobs (2003).

For a lake fishery to occur, the spawner escapement must be forecasted to exceed 3,300 and 2,200 in Siltcoos and Tahkenitch Basins, respectively. Under the FMEP, there are no fishery effects on spawner escapement and nutrient input below these run sizes. At run sizes between 3,300 and 3,900 in Siltcoos Lake and between 2,200 and 2,600 in Tahkenitch Lake, the corresponding spawners per mile are 102 and 220 for Siltcoos and Tahkenitch Lakes, respectively. At run sizes in excess of 3,900 in Siltcoos Lake and 2,600 in Tahkenitch Lake, fisheries would not limit carcass input.

Diversity

The important diversity considerations are how human actions may affect a population's or ESU's life history traits and natural diversity such as run timing, age structure, size, fecundity, morphology, behavior, and genetic characteristics (NMFS 2000). It is possible for fishery harvest to alter life history diversity characteristics. However, given the low numbers of coho salmon proposed to be harvested in the FMEP and given Amendment 13 limits, as long as the harvest in the lakes is spread throughout the breadth of the run, it is unlikely any diversity changes will occur from the lake harvest.

An important genetic consideration related to life history diversity is maintaining a large enough effective breeding population to prevent genetic bottlenecks, inbreeding, and deleterious genetic accumulations. Every spawner does not contribute equally to future generations. Determining the effective population size requires information on the sex ratios, the mating system, the fecundity of individual females, and patterns of genetic variation (Ratner et al. 1997). In general, an effective population size between 500 and 5,000 fish per generation over the long term would likely maintain the genetic variability of a population (Thompson 1991). In the case of Siltcoos and Tahkenitch Lakes, this population of coho salmon has a three year generation time. In recent years, the average abundance of this population (see section 4(i)(A) above for a description of this population) has been more than 6,000 coho salmon per year. This would correspond to an abundance of 18,000 fish per generation. Under the FMEP, a minimum of 5,500 (2,200 and 3,300) fish would have to spawn annually before a lake fishery would occur. This would correspond to more than 15,000 fish per generation. Even though it is not certain what the sex ratios and mating systems are for this population, it is likely the FMEP would not contribute to a low effective population size for Siltcoos and Tahkenitch Lakes.

(C) Sets escapement objectives or maximum exploitation rates for each management unit or population based on its status, and assures that those rates or objectives are not exceeded

The ODFW's FMEP specifies two criteria that will be used to manage the coho salmon fishery in Siltcoos and Tahkenitch Lakes. First, the minimum spawner escapement must exceed 3,300 and 2,200 adults in Siltcoos and Tahkenitch Lakes, respectively, *after* a fishery in the lakes. Second, the lakes harvest must not exceed 1,000 adults (600 in Siltcoos and 400 in Tahkenitch) or the

maximum allowable harvest limits specified in Amendment 13 (the harvest plan for the Oregon Coast ESU; Table 3). The Amendment 13 limits are cumulative fishery impacts from ocean and freshwater fisheries. In 2003, the allowable fishery impact level is 30% for the Siltcoos/ Tahkenitch coho population. The ocean fishery should not exceed a 15% harvest impact on coastal coho salmon. This leaves approximately 15% of unused harvest impacts. If spawner escapements are forecasted to exceed the specified escapement numbers, then a lake fishery could be implemented. The fishery would close once the fishery quota is met or cumulative mortality was 30% (whichever comes first). This is how the fishery would be planned and implemented each year. Further details are described in section 1.4 of the FMEP.

Table 3. Harvest quota sliding scale proposed in the FMEP for each lake.

Number of Adult Coho Entering Lake	Lake Fishery Adult Quota
Siltcoos Lake	
<3300	No Fishery
3300-3900	No more than 300 fish
>3900	No more than 600 fish or max. allowable under Amendment 13, which ever is less
Tahkenitch Lake	
<2200	No Fishery
2200-2600	No more than 200 fish
>2600	No more than 400 fish or max. allowable under Amendment 13, which ever is less

The specific fishery quotas for each lake depends upon the size of the run entering the lake. The sliding scale proposed in the FMEP to determine the fishery quota is specified in Table 3. This fishery quota schedule ensures that a fishery in the lakes will never result in fewer spawners than the minimum escapement targets and that no more than 600 and 400 adult coho salmon will be harvested annually from Siltcoos and Tahkenitch Lakes, respectively. In addition, the lake fishery will be managed as to not exceed the cumulative harvest impact rates identified in Amendment 13. As designed, the FMEP precludes any fishing until viability criteria for coho salmon in each lake are met (instead of critical thresholds). The FMEP further saves the largest returns from additional fishery impacts (i.e., fisheries could not crop down larger returns).

(D) Displays a biologically based rationale demonstrating that the harvest management strategy will not appreciably reduce the likelihood of survival and recovery of the ESU in the wild, over the entire period of time the proposed harvest management strategy affects the population, including effects reasonably certain to occur after the proposed actions cease.

There are three important aspects of harvest management for the Oregon Coast coho salmon ESU that need to be considered when evaluating whether or not to approve a recreational fishery that targets and kills fish from a population that is listed under the Endangered Species Act (ESA): consistency with the PFMC's ocean harvest plan Amendment 13; consistency with the criteria of the ESA 4(d) Rule; and appropriately responsive management measures to ensure the lake fishery does not impede the long-term viability of the population.

Amendment 13 Harvest Plan

Substantial harvest reductions on Oregon Coast coho salmon have occurred since the early 1990s in response to declining natural fish returns. The State of Oregon has lead the way in developing a recovery plan for coastal coho salmon (the Oregon Plan (State of Oregon 2003)). In 1997, NOAA Fisheries and the ODFW negotiated a harvest matrix framework plan for Oregon Coast coho salmon. Oregon assured NOAA Fisheries at the time that this harvest framework would be implemented for ocean and freshwater fisheries through the Oregon Plan. Since 1997, Oregon and the PFMC has implemented the coho harvest matrix annually. This harvest matrix has been adopted by the PFMC as Amendment 13 to the Pacific Salmon Plan. The harvest matrix is shown in Table 1. The concept of the matrix is that if parent spawner escapement and ocean survival are good, then coho salmon could withstand higher harvest impacts. The Oregon Coast coho salmon ESU is divided into four different groups ("subaggregates"). Before harvest impacts can increase in a mixed-stock fishery (e.g., in the ocean), the weakest group must meet the specified spawner escapement criteria. This is a weak stock management approach that is new since the implementation of this coho harvest matrix. NOAA Fisheries has consulted with the PFMC under section 7 of the ESA on the implementation of Amendment 13 (NMFS 1998). The determination of the Biological Opinion was that implementation of harvests pursuant to Amendment 13 did not jeopardize the continued existence of Oregon Coast coho salmon.

In recent years, some runs of wild coho salmon along the Oregon Coast have been rebounding. The Tenmile, Siltcoos, and Tahkenitch Lakes, and the Coos and Rogue Rivers are examples. Recently, some of these populations have exceeded escapement criteria, which would allow harvest impacts to increase above the ocean fishery impacts of 7-15%. However, since there have been weak stocks of coho salmon mixed with some of these runs, ocean fishery impacts have not increased. The only opportunity for increased harvest has been in terminal areas likes bays and rivers where the healthy runs return. In the late 1990s, Rogue River coho salmon returns were at levels that justified a 20% harvest rate. At that time, the ODFW did not propose any additional

harvest in the Rogue bay and river because surplus hatchery-origin coho salmon could be harvested by anglers in selective fisheries with only minimal incidental impact on natural fish.

In contrast, there are no hatchery coho salmon present in Siltcoos and Tahkenitch Lakes. The population of coho salmon is currently healthy and harvest impacts could increase on these runs under the provisions of Amendment 13. ODFW is interested in allowing anglers to harvest some of the wild coho salmon returning to these lakes. As described above, the ODFW proposes that harvest of natural coho salmon can occur under limited conditions without adversely affecting the viability of the Oregon Coast coho salmon ESU.

The ODFW is proposing that there are unused harvest impacts as specified in Amendment 13, which could accommodate the fisheries in the lakes. The FMEP proposes to implement a lake fisheries within the limits specified in Amendment 13. No harvest impacts above and beyond those already approved by NOAA Fisheries via the section 7 consultation on Amendment 13 are being proposed. The FMEP seeks to fill a gap in management by tailoring fisheries to local conditions and circumstances. There are minimum escapement requirements for each of the lakes (see Figure 2 and Figure 3) that provide a management buffer above the viable abundance levels, and long-term productivity rates must be one or greater, on average.

The FMEP also specifies fishery quotas for each lake based on the estimated return of adult coho salmon to each lake (Table 3, Figure 8, Figure 9). The maximum number of coho salmon harvested would be 600 and 400 adult coho salmon if the runs exceeded 3,900 and 2,600 fish entering Siltcoos and Tahkenitch Lakes, respectively, and there were unused harvest impacts as determined in Amendment 13. This ensures that no more than 1,000 fish will be harvested from a total run of at least 6,500 adult coho in Siltcoos and Tahkenitch Lakes and cumulative fishery impacts never exceed the guidelines in Amendment 13.

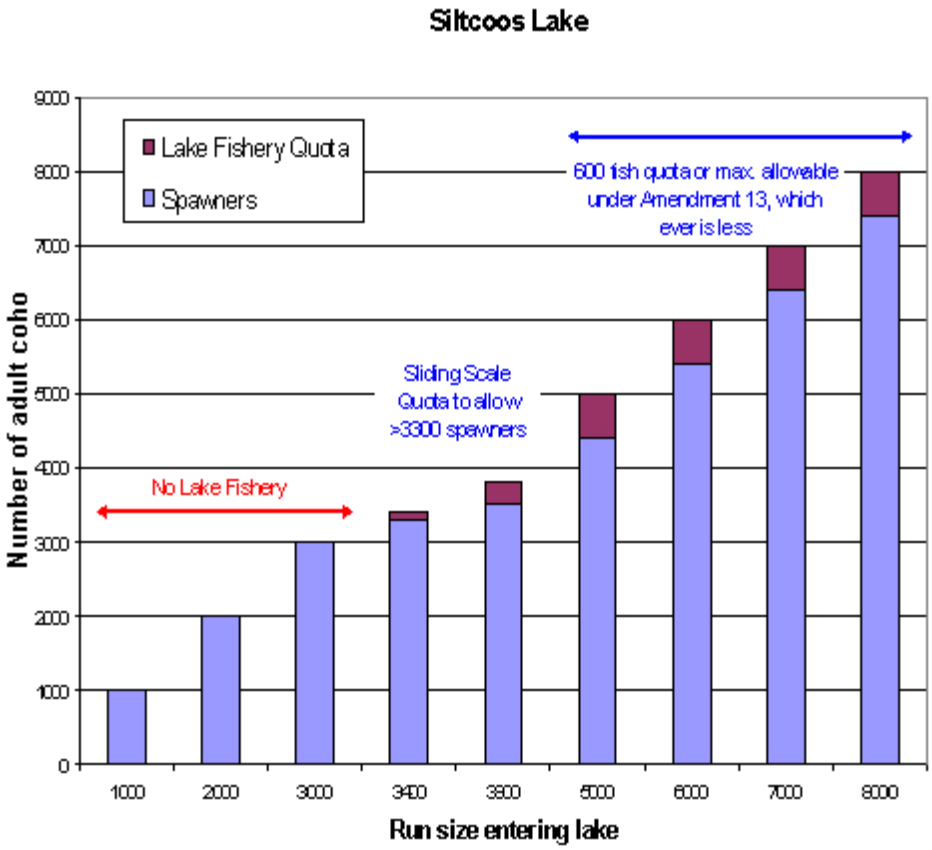

Figure 8. Abundance-based sliding scale fishery quotas for Siltcoos Lake.

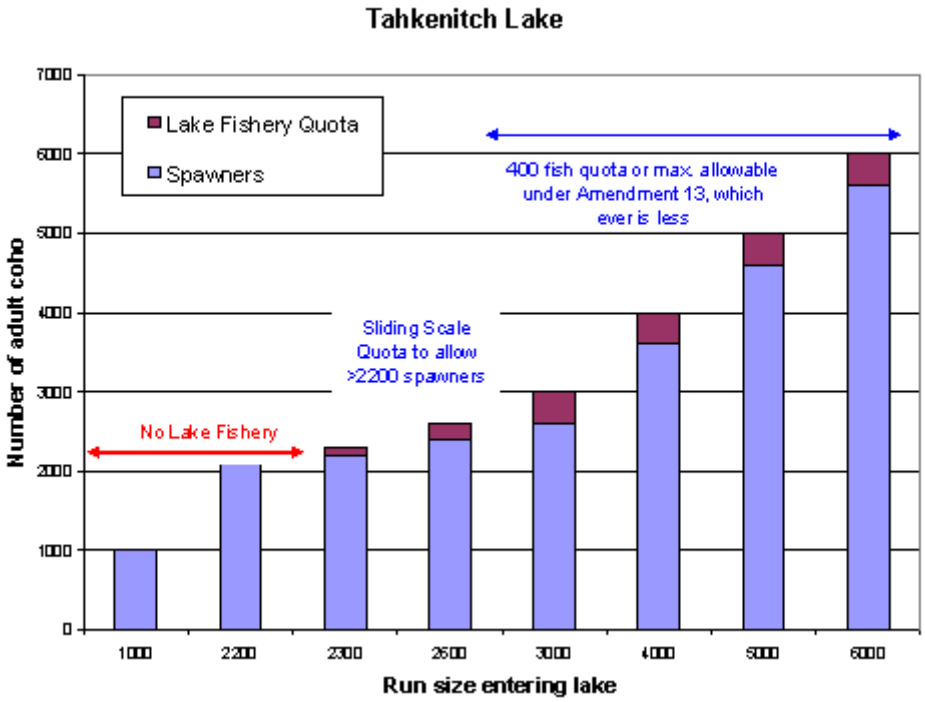

Figure 9. Abundance-based sliding scale harvest quotas for Tahkenitch Lake.

Where there are concerns over listed stocks, NOAA Fisheries has been encouraging the co-managers to move away from mixed stock fisheries and implement more terminal area fisheries where surplus fish are available. The FMEP for Siltcoos and Tahkenitch Lakes proposes a terminal area fishery to harvest surplus coho salmon. The weak stocks in the ESU (i.e., the Northern sub-aggregate) will be avoided. This type of terminal area fishery provides an appropriate mechanism to allow harvest impacts to increase on some stocks under Amendment 13 while continuing to afford the protection needed on other weak stocks within the ESU.

(E) Includes effective (a) monitoring and (b) evaluation programs to assess compliance, effectiveness, and parameter validation

Section 3 (Monitoring and Evaluation) of the FMEP provides a more detailed explanation of the monitoring programs that will occur in Tahkenitch and Siltcoos Basins to monitor catch and spawner escapement. A statistical creel survey will be conducted in years when a lake fishery occurs on coho salmon. Spawning ground surveys are conducted annually throughout the basins by ODFW and U.S. Forest Service to estimate spawner numbers and distribution. Surveys record

numbers of live fish, carcasses, and redds. Data on length frequency, and sex, and age composition of the returning adults are also collected.

(F) Provides for (a) evaluating monitoring data; and (b) making any revisions of assumptions, management strategies, or objectives that data show are needed will be made

As explained in sections 3.5.1 and 3.5.2 of the FMEP, ODFW will evaluate the monitoring data on an annual basis. Reports will be provided to NOAA Fisheries, Salmon Recovery Division, no later than June 1 of each year. These reports will be provided to NOAA Fisheries and will include biological and fishery information from the previous year, as well as estimated coho abundance for the upcoming year and the plans for a fishery in the upcoming season (if any), including the dates of the fishery and fish quota for each lake. The ODFW has also committed to developing better predictors of coho abundance and viability for each lake – progress on these predictors and their application to fishery management will be taken into account as they are developed. In addition, a comprehensive review of the FMEP is scheduled to occur every three years (a full brood cycle) to evaluate whether the fisheries and natural populations are performing as expected. Comprehensive reviews will be repeated at three year intervals thereafter until such time as the natural stocks are recovered and delisted. The comprehensive reviews will allow management assumptions to be further verified and allow new information or findings to be incorporated into the FMEP. This includes the determinations from formal recovery planning efforts by the Technical Recovery Team.

(G) Provides for (a) effective enforcement, (b) education, (c) coordination among involved jurisdictions

Enforcement would be the responsibility of the Oregon State Police and Lane County Sheriff through routine checks of anglers and volunteers observing angling violations and reporting violations to local authorities. Siltcoos and Tahkenitch Lakes do not generally have many fishing violations (R. Lane, Oregon State Police, pers. comm., to L. Kruzic, NOAA Fisheries, November 10, 2003).

Public outreach would be accomplished through announcements at the monthly meeting of the Florence Salmon and Trout Enhancement Program, articles in local and regional newspapers, local watershed council meetings, the Oregon Department of Fish and Wildlife Commission meeting, and the *Ifish.net* discussion board. The announcements would indicate areas that would be closed to fishing for coho salmon, when fishing could occur, and what fishing gear would be allowed. If immediate changes to the fishery are needed, signs would be placed at all boat ramps and announcements would be made via the outreach methods mentioned above.

(H) Includes restrictions on resident and anadromous species fisheries that minimize any take of listed species, including time, size, gear, and area restrictions

There are restrictions currently in place that prohibit the retention of juvenile coho salmon in Tahkenitch and Siltcoos Lakes. The inlet and outlet streams of the lakes are closed to salmon fishing. Only trout longer than eight inches can be retained, which minimizes take of juvenile coho salmon. These restrictions would remain in place under the proposed FMEP.

(I) Is consistent with other plans and conditions established within any Federal court proceeding with continuing jurisdiction over tribal harvest allocations

There are no Federal court proceedings with continuing jurisdiction over tribal harvest allocations that are relevant to the implementation of the FMEP with respect to Oregon Coast coho salmon.

(4)(ii) The state monitors the amount of take and provides to NOAA Fisheries a report on a regular basis

As described in section 3.5.1 of the FMEP, the ODFW will assess compliance with the provisions of the FMEP annually. The runs of coho salmon will be monitored every year with further restrictions to the fisheries made inseason in years that catch limits are obtained or minimum escapement thresholds are not expected to be achieved. Annual reports which summarize how the previous year's fishery and natural fish runs performed relative to the standards and guidelines specified in the FMEP will be provided to NOAA Fisheries by June 1st of each year the FMEP is in effect.

(4)(iii) The state confers with NOAA Fisheries on its fishing regulation changes

As stated in section 3.5.1 of the FMEP, the ODFW will confer with NOAA Fisheries if spawner abundances decline below the viable threshold escapement targets or if fishery impacts exceed allowable levels. Information on any proposed regulation change will be provided at least 2 weeks in advance of the decision being made.

(4)(iv) Written concurrence

If the determination is made that the FMEP adequately addresses all of the criteria specified in limit 4 of the 4(d) Rule, NOAA Fisheries will issue a letter of concurrence, which will specify the necessary implementation and reporting requirements, to ODFW to implement the fisheries in accordance with the final FMEP.

Processing of the Public Comments Received

As required in (4)(iii) of section 223.203 of the 4(d) Rule, before a FMEP can be approved or amended, the public must have had an opportunity to review and comment on the FMEP. The FMEP underwent a public comment period for 30 days (August 29, 2003, 68 FR 51995). In addition, the draft National Environmental Policy Act Environmental Assessment of the FMEP underwent a public comment for 15 days (October 24, 2003, 68 FR 60915). A total of 53 comments were received during the public review periods. Forty-nine of the comments were characterized as supporting the proposed coho salmon fishery. Four of the submitted comments opposed the fishery or had key questions or issues with the proposal. Of the four comments in opposition to the proposed fishery, only three provided an explanation of their concerns. NOAA Fisheries and ODFW held a public meeting on October 23, 2003, in Salem, Oregon. All of the commenters who had expressed concern or had questions about the FMEP were invited. The purpose of the meeting was to have an informal discussion of the FMEP to answer questions. The meeting was attended by all of the parties who raised detailed concerns about the FMEP. In addition, several fisherman and local fishing resort owners from Siltcoos Lake were present.

Below are brief responses to the written comments submitted by the public during the comment period on the FMEP.

Comment 1: Require all anglers who fish for coho salmon to check in and out so that fishery effort and catch can be monitored closely.

Response: This is a good idea. ODFW and NMFS are exploring this possibility based on access points to the lakes. A statistical creel survey would occur in years the fishery would be conducted, if the FMEP is approved.

Comment 2: The number of spawning miles estimated by ODFW is over-estimated and thus overestimates the number of spawners in each of the lake basins.

Response: A stratified random sampling is done to estimate the total number of spawners throughout the entire Oregon Coast ESU. This methodology has been peer reviewed and the reports are published by ODFW. The data set provided by Jacobs (2003) shows the high numbers of coho salmon observed in the samples for both lakes. These are some of the highest densities observed in the state of Oregon. It is reasonable to conclude that the population is not greatly over estimated.

Personnel who operate the fish ladder and dam on Siltcoos and Tahkenitch Lakes believe ODFW abundance estimates are too low. This is based on the large numbers of coho salmon observed at the dam throughout the run.

The ODFW surveys conducted with statistical rigor are the best available information on coho salmon abundance in Siltcoos and Tahkenitch Lakes.

Comment 3: Does Indicator 3 of the FMEP provide for recovery of the coho populations and include nutrient input from carcasses? Bilby says 200 coho spawners per mile are needed to provide nutrient enrichment to streams.

Response: This was assessed in section 4(i)(B) above.

Comment 4: The Viable thresholds for abundance do not take into account biological function or effective breeding population size.

Response: This was assessed in section 4(i)(B) above.

Comment 5: The Critical thresholds for abundance are too low.

Response: The critical thresholds were specified because they are a requirement of the 4(d) Rule limit 4. However, the critical thresholds will not be used for fishery management. The triggers for allowing a fishery in the lakes are the viable, not the critical, thresholds (a minimum of 3,300 and 2,200 spawners in Siltcoos and Tahkenitch Lakes, respectively).

Comment 6: Harvest regime in Amendment 13 does not take into account nutrient enrichment or gene conservation.

Response: Amendment 13 provides minimum escapement numbers for four sub-aggregates of the ESU before harvest impacts can increase. These numbers likely provide a minimum number of fish needed to avoid genetic risks from low abundances. Nutrient enrichment was not explicitly addressed in Amendment 13. Although under the conservative harvest rates in Amendment 13, it is not likely harvest would substantially limit attaining nutrient enrichment standards in these lakes under the conditions that would pertain when fisheries could take place, because of the low percentage of the runs being harvested.

Comment 7: How will it be known whether a 30% harvest rate is exceeded in ocean and freshwater fisheries?

Response: The fisheries will be monitored to assess the catch of coho salmon. The maximum harvest rate allowed in the ocean fisheries will be used for deciding whether a lake fishery can be implemented. For example, in the Pacific Fishery Management Council's preseason process for developing 2003 fisheries, a maximum harvest rate of 15% was approved. The fisheries were designed at a 12-14% rate, and are currently being managed for a 13% harvest rate. The FMEP would assume the worst case scenario of 15%. The number of fish that could be harvested in the

lake fishery would then be determined based on the forecasted run to the lakes. The quota would be set at the number of fish that would result in a cumulative harvest impact of 30% to the lakes' population.

Comment 8: The Viable threshold standards for abundance were not met for many years over the 42 year dataset.

Response: True. However, over the past 42 years Oregon Coast coho were harvested at very high rates until 1993. Harvest rates in excess of 60% prevailed for most of the years in the dataset which resulted in low returns. Under the new harvest plan for listed coho salmon, harvest rates will never exceed 45%.

Comment 9: Will Oregon State Police monitor the fishery to make sure regulations are complied with?

Response: Yes. Enforcement will occur if a fishery is implemented. Oregon State Police was consulted during NOAA Fisheries' evaluation of the FMEP to better understand enforcement issues and violations (see section (G), above).

Comment 10: The 4(d) Rule does not allow for direct take in a fishery.

Response: With respect to fishery harvest activities, the preamble of the 4(d) Rule contemplates that:

> ". . . the biological impact of take on the ESU is the same, whether a particular number of listed fish are lost as a result of incidental impacts or intentional (directed) impacts."
>
> "Harvest activity will have direct impacts in very few situations—generally where the status of the affected population is already considered viable, even though the status of the larger ESU is not."
>
> ". . . in setting out the standards by which any fishery harvest programs will be judged, NMFS has emphasized the means by which a management scheme maintains or achieves viable status for a populations rather than on the specific mechanism by which that impacts may be incurred. This final rule does not give a pass to any specific management plan at this time; each plan must be made available for public comment and reviewed against the standards for an FMEP."

NOAA Fisheries foresaw that there may be situations where a specific run of listed fish may be healthy, such as in Siltcoos and Tahkenitch Lakes, and certain actions can be taken that would not adversely affect the viability of the ESU as a whole, which may still be in poor condition, or interfere with recovery of the ESU. The effects of the fishery on the listed species is the standard, and whether the fishery results in an incidental or direct take appropriately becomes a part of the impact analysis, rather than an explicit criterion.

Comment 11: This FMEP ignores the upcoming TRT work and ODFW's conservation plan for coho salmon.

Response: ODFW included language in the FMEP to revise VSP thresholds and population designations based on the TRT if necessary in the future. The FMEP will also be evaluated periodically to ensure the overall objectives of the FMEP are being accomplished.

DETERMINATION

As evaluated above, it is the recommendation of the Salmon Recovery Division that the Regional Administrator determine that the FMEP for the Siltcoos and Tahkenitch Lakes coho salmon fishery submitted by ODFW adequately addresses all of the criteria established for limit 4 of the 4(d) Rule. If the Regional Administrator so finds and approves the FMEP, the take prohibitions would not apply to fisheries implemented in accordance with the approved FMEP and NOAA Fisheries' letter of concurrence.

Literature Cited

Bakke, B. 2003. Comments on Coastal Lakes Coho Fishery Management and Evaluation Plan. Public comments submitted to L. Kruzic, NOAA Fisheries, from Native Fish Society. Available from NOAA Fisheries, 2900 NW Stewart Parkway, Roseburg, Oregon 97470.

Cederholm, C.J., M.D. Kunze, T. Murota, and A. Sibatani. 1999. Pacific salmon carcasses: essential contributions of nutrients and energy for aquatic and terrestrial ecosystems. Fisheries 24:6-15.

Jacobs, S. 2003. Siltcoos and Tahkenitch Coho Spawner Monitoring. Handout at ODFW/NMFS public meeting October 22, 2003. Salem, Oregon.

NMFS (National Marine Fisheries Service). 1998. Endangered Species Act Section 7 Consultation. Supplemental Biological Opinion and Incidental Take Statement. The Pacific Coast Salmon Plan and Amendment 13 to the Plan. Northwest and Southwest Regional Offices. National Marine Fisheries Service. Available from NMFS, 525 NE Oregon St, Suite 510, Portland, Oregon 97232.

NMFS (National Marine Fisheries Service; NOAA Fisheries). 2000. Viable salmonid populations and the recovery of evolutionary significant units. NOAA Tech. Memo NMFS-NWFSC-42.

ODFW (Oregon Department of Fish and Wildlife). 2003. Fisheries Management and Evaluation Plan. Oregon Coastal Coho, Siltcoos and Tahkenitch Lakes Coho Fishery. Salem, Oregon. November 2003.

PFMC (Pacific Fishery Management Council). 2003. Amendment 13 to the Pacific Coast Salmon Plan. Hard copies available from Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, Oregon 97220. Website *www.pcouncil.org*

Ratner, S., R. Lande, and B.B. Roper. 1997. Population viability analysis of spring chinook salmon in the South Umpqua River. Conservation Biology 11:879-889.

State of Oregon. 2003. Oregon Plan for Salmon and Watersheds. Available from Governor's Office, Natural Resources Office, Public Service Building, 3rd Floor, 255 Capitol Street NE, Salem, Oregon 97301.

Thompson, G.G. 1991. Determining the minimum viable populations under the Endangered Species Act. NOAA Technical Memorandum NMFS F/NWC-198.

Zhou, S. 2000. Stock assessment and optimal escapement of coho salmon in three Oregon coastal lakes. Information Report. Fish Division, Oregon Department of Fish and Wildlife. Portland, Oregon.